

Analytical Chemistry

A STUDY OF THE ENVIRONMENTAL MOBILIZATION OF SELENIUM PRESENT IN INDUSTRIAL FLY ASH

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Selenium is a necessary component for proper nutrition in humans and in some animals; however, at certain levels it is also a toxin and an environmental poison. We have been studying the environmental mobilization of selenium from fly ash produced via the coal combustion process in electric power generation. There are different pathways in which selenium can be mobilized in the environment. One pathway is by the dissolution of selenium in surface water, which is then dispersed by water movement and made available to the roots of plants. Another pathway is by the methylation of anaerobic microorganisms that lead to the production of the gaseous species dimethylselenide $[(CH_3)_2Se]$ and trace amounts of the gaseous species dimethyldiselenide $[(CH_3)_2Se_2]$. We have found that soil pH and the fly ash concentration in the soil are factors that affect the selenium mobilization. We are using microwave digestion and atomic absorption spectroscopy to try to determine the selenium concentration in fly ash and gas chromatography coupled with atomic absorption spectroscopy to study the methylation of selenium by anaerobic microorganisms present in soil. The current results of our research dealing with the influence of pH on the methylation of selenium by anaerobic microorganisms and the effects of the selenium concentration in fly ash will be discussed.